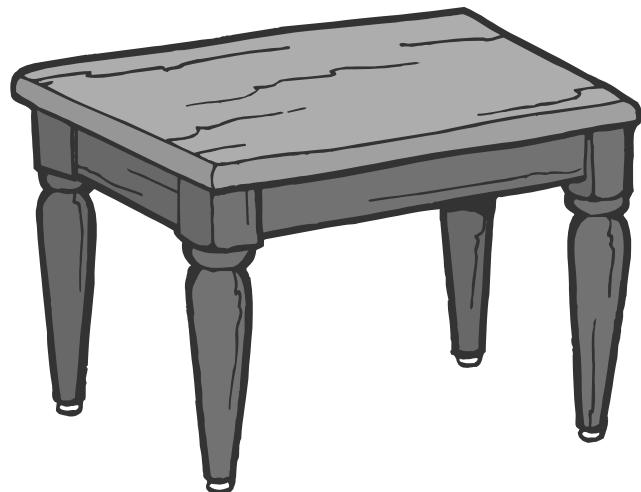
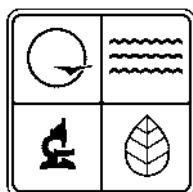


Preventing Pollution in Wood Furniture Manufacturing



***A Guide to Environmental Compliance and
Pollution Prevention for Wood Furniture Manufacturers
in Missouri***



Missouri Department of Natural Resources
Environmental Assistance Office
1-800-361-4827

June 2005

The information in this publication is intended as general guidance only. For specific requirements, the reader should consult the appropriate federal and state laws and rules.

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Preventing Pollution in Wood Furniture Manufacturing

As environmental protection becomes more and more important across the nation, industries of every type are faced with some big questions:

- What environmental regulations apply to me and my facility?
- How do I comply with those regulations?
- Are there things I can do to reduce the regulations I must meet?
- How can I protect myself from fines and liability?
- How do I protect myself and my workers from environmental hazards in the shop?

This publication can help wood furniture manufacturers in Missouri answer some of those questions. The guides provide basic information about regulatory requirements and suggestions for protecting yourself, your workers and the environment through pollution prevention.

Each guide sheet in this publication deals with an issue that you may face in your wood furniture business. The guides will not answer every question you have. After reviewing them, you should be able to decide if you need more information or assistance on a particular issue. The topics are listed on the back of this page.

The Missouri Department of Natural Resources has an Environmental Assistance Office (EAO) to help people comply with environmental regulations and find ways to prevent pollution. If you need assistance, call the EAO at 1-800-361-4827.

Guide Sheets for the Wood Furniture Manufacturing Industry

Pollution Prevention
Adhesives and Gluing Operations
Aerosol Cans
Air Quality Permits
Backflow Prevention
Dust Collection
Energy Conservation
Finishing Operations
Floor Cleaning
Fluorescent Bulbs
Hazardous Waste
Hazardous Waste Management
Maximum Achievable Control Technology
Paint Booth Filters
Painting/Staining/Sealing/Top Coat Wastes
Shop Towels
Solid Waste
Solvents
Solvent Disposal
Solvent Recycling
Spills
Storm Water Permits
VOCs and HAPs
Wastewater
Water Conservation

If you have comments or suggestions for ways to improve these guide sheets, please let us know by calling EAO at 1-800-361-4827.

For More Information

Missouri Department of Natural Resources
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P.O. Box 176
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1-800-361-4827 or (573) 526-6627
www.dnr.mo.gov/oac/env_assistance.htm



Pollution Prevention

Wood furniture manufacturing facilities deal with many things that can affect the environment. Materials such as paints, wood treatments, stains, varnishes, polishes, and adhesives can harm the environment and people if they are not properly managed. Wood working operations produce waste wood and sawdust. State and federal environmental regulations explain what legally can and cannot be done with these materials. The regulations describe proper disposal and how pollution (waste) should be controlled, stored and treated. A better solution is to prevent the waste or pollution.

What is Pollution Prevention?

Pollution prevention is simply not making the waste (or pollutant) in the first place. It means doing what we can to reduce the amount and toxicity of the pollution we generate. Preventing pollution may be something as simple as using a catch basin to prevent spills, or something as complex as redesigning your operation to increase efficiency and reduce waste. Simple things like choosing non-hazardous solvents when possible can protect the environment and reduce the number of environmental regulations that you are faced with. Pollution prevention means thinking about the environmental impact of your actions and trying to limit that impact.

Why Prevent Pollution?

When we generate waste or pollution, we must safely and legally manage that waste or pollution. Whether it is household trash or waste from a business, managing wastes costs money. And usually the things we discard are materials we paid for when we got them. A good example is paper towels. We buy them, use them once, then pay again for disposal as trash. If we reduce the amount of waste we generate, we save money. It's as simple as that. Reducing costs is a major reason to prevent pollution. Here are a few others:

- Improved work environment and worker safety.
- Reduced liability.
- Increased efficiency.
- Fewer regulatory requirements.
- Better environmental protection.
- Enhanced marketing and public relations opportunities.

What Can Be Done At Wood Furniture Manufacturing Facilities?

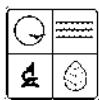
There are many ways to prevent pollution at wood furniture manufacturing facilities. The topic guide sheets in this publication have specific suggestions on ways to prevent pollution. Here are a few general tips:

- Make a list of your wastes. Then try to find a way to eliminate each of them. For example, if you throw away paper towels, consider using washable shop towels.
- Keep work areas clean and well organized to help prevent accidents.
- Change work practices to minimize spills. Use drip pans where spills may occur.
- Fix leaks immediately.

- Work closely with suppliers to provide just-in-time delivery when practical. Order accurate amounts needed for the job. Leftovers may become waste.
- Purchase the largest practical container (containers usually end up as waste), but don't purchase more than you need.
- Purchase the least toxic or hazardous product available. Check the material safety data sheets for products you purchase. If the product is toxic or hazardous, ask your supplier for alternatives.
- Inspect materials upon delivery. Immediately return unacceptable materials. Date materials and use a first-in, first-out policy to ensure that older materials are used up before new ones are opened.
- If you do have excess or unneeded materials, see if your supplier can take them back.
- Include the cost of disposal when you make purchasing decisions. What looks like the cheapest option may cost more because of disposal or other management costs.
- Wiping stains can be applied with a sponge, brush, rag or roller, instead of being sprayed.
- Determine whether equipment cleaning is really necessary – you may find it is not.
- Minimize the number of times you clean your equipment. Apply light-colored finishing materials first, then progressively use darker coatings whenever possible.
- Reduce the number of solvents used by finding one multi-purpose solvent that can serve a variety of purposes.
- Use solvents until they lose their effectiveness, as opposed to when they look dirty. Extend solvent life by filtering solids.
- Use rubber wipes instead of rags to remove coatings from tank walls.
- Store materials in a way that keeps them from being damaged.
- Make sure all items are clearly labeled. Store products in original containers.
- Store wastes separately and be sure they are properly labeled to make it easier to reuse or recycle them.
- Store items that could leak in a place where leaks will be contained and easily spotted.
- Inspect storage areas regularly for leaks or other damage.
- Be sure employees are trained to minimize waste in wood working and finishing operations.
- Establish a maintenance schedule for each piece of equipment.
- Limit access to your finishes and solvents.
- Keep containers tightly closed when not in use.
- Mix only the amount of coating needed and according to manufacturer's specifications.

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Adhesives and Gluing Operations

Wood furniture assembly glues commonly contain solvents. These solvents, called Volatile Organic Compounds or VOCs, contribute to the formation of ozone, which can cause health problems and smog. Some solvents have been demonstrated to be hazardous to health in any concentrations. These are called Hazardous Air Pollutants (HAPs). Product material safety data sheets (MSDS) will show if they contain any HAPs and how much is in the product. Some HAPs often found in glue are methyl isobutyl ketone, methyl ethyl ketone, xylene, toluene, and trichloroethane.

Waste adhesives and their cleanup can produce hazardous waste (see the *Hazardous Waste* guide sheet included in this booklet) and proper handling and disposal of this waste is costly. Reducing your usage and waste generation will benefit your business and the environment. For more information see the *Managing Hazardous Waste* guide sheet.

There are low emission substitutes for solvent-based, urea formaldehyde and some epoxy resin adhesives. Consider substituting hot melt, heat seal, aqueous-based, or PVA adhesives. (PVA glues are aqueous-based synthetic latex systems and are the primary glues for solid wood.) These glues do not generate significant air emissions and are considered very good alternatives to solvent-based adhesives.

In scheduling purchases consider shelf life of the adhesive and your needs. Mixed or catalyzed glues have a pot life that should be considered in your assembly operations to avoid having excess become waste.

Moisture content of the wood is very important to a good glue joint. Make sure the moisture content is in equilibrium with conditions in the shop and that it is within the range needed for proper joining. This prevents discarding pieces that fail at the next manufacturing step.

Remember

- Many common adhesives become hazardous waste when disposed. Find out whether the waste is hazardous and manage it properly.
- Volatile organic compounds in solvent-based adhesives contribute to the formation of ozone and smog.
- Many solvents are also hazardous air pollutants that are dangerous to human health in any concentration.

Pollution Prevention Options

Preventing pollution instead of treating or disposing of waste can save money, protect the environment and reduce risk to people. Here are some suggestions:

- ✓ Evaluate your gluing operations to determine if too much is being mixed.

- ✓ Purchase only the amount you need to avoid waste of material beyond its shelf life.
- ✓ Switch to low or no solvent adhesives if possible, such as hot melt, heat seal, aqueous-based, or PVA adhesives.
- ✓ Check moisture content to ensure good joints.
- ✓ Keep glue containers covered when possible to prevent vapors from escaping and to prolong the life of the adhesive mixture.
- ✓ Perform periodic maintenance and calibration of glue applicators for proper transfer and reduced glue losses.
- ✓ Inspect surfaces thoroughly for evenness.
- ✓ Let glue completely set before removing pieces from the presses.

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Aerosol Cans

Wood furniture manufacturers use aerosol cans for various reasons. Spray cans may contain hazardous chemicals, such as 1,1,1-trichloroethane or toluene. In some cases, the aerosol can may be hazardous waste because of what it contains or once contained. It is important to carefully manage this waste to protect human health and the environment.

Aerosol cans are often recycled as scrap metal. If the empty cans are recycled, the can and the residue inside are not considered waste so most hazardous waste regulations don't apply. If the can is not empty, it can still be recycled if the recycler is able to properly capture and manage the vented contents. However, if the aerosol can contained an acutely hazardous waste such as some pesticides, it is unlikely that the recycler will be able to properly clean the container. These containers will probably require disposal as hazardous waste. See the *Hazardous Waste* guide sheet for more information on acutely hazardous waste. Empty aerosol cans that did not contain hazardous waste and are not recycled may be sent to the sanitary landfill with regular solid waste.

If only one or two waste aerosol cans are emptied infrequently, and you are a conditionally exempt small quantity generator (CESQG), they can go to a sanitary landfill for disposal (even if they are not empty), if the landfill is willing to accept them. If the can contains pesticide, but the pesticide is not acutely hazardous waste, the landfill must agree to take them for disposal. If more than two cans are generated, it is necessary to determine whether the waste is hazardous waste and manage it properly. See the *Hazardous Waste* guide sheet, for more information.

Ask the supplier to take back any defective cans. The manufacturer can sometimes repackage the contents. Some products are also available in non-pressurized spray bottles or can be purchased in bulk and used in non-pressurized refillable sprayers.

Remember

- Aerosol cans may be hazardous waste. Find out whether the waste is hazardous and manage it properly.
- Empty cans, and sometimes cans that are not empty, can be recycled. Sometimes the contents can be reused.

Pollution Prevention Options

Preventing pollution instead of treating or disposing of waste can save money, protect the environment and reduce risk to people. Here are some suggestions:

- ✓ Decide if these products are actually needed. If not, either use up the remaining product or properly dispose of it and don't purchase any more. If the product is needed, limit use and look for aerosol cans that do not contain hazardous chemicals.
- ✓ Switch to non-aerosol products if possible, such as manual pump cans or bottles, especially if they can be refilled.

- ✓ Use as much of the material for its intended purpose as possible.
- ✓ Purchase only the amount you need.
- ✓ Follow label directions to prevent clogging.
- ✓ If using aerosol cans that contain hazardous materials, look for non-hazardous alternatives.

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Air Quality Permits

Air quality in Missouri is protected under the Federal Clean Air Act and Amendments and state law. These laws are implemented in state and federal regulations. Permits tell businesses what regulations affect them and how to achieve compliance with these regulations.

Many existing and new wood furniture manufacturers will need to have an air operating permit. New plants or expansion of existing plants could require an air construction permit before building as well as an operating permit. Whether a permit is required depends on the air emissions associated with the plant's maximum production rate. Air emissions include dust from wood working operations and solvent emissions from gluing and finishing operations.

Of particular importance to wood furniture manufacturers is a federal regulation called maximum achievable control technology (MACT) that is designed to reduce emissions of hazardous air pollutants (HAPs) that are more stringently regulated because of their effects on human health. For more on the MACT standard, see the *Maximum Achievable Control Technology* guide sheet in this publication. Many solvents commonly found in wood furniture manufacturing contain HAPs. For assistance in determining if your existing or proposed business is covered by the MACT standard or if a permit may be required, call the Environmental Assistance Office (EAO) at 1-800-361-4827 or another environmental professional.

Applying pollution prevention principles can reduce air emissions and in some cases eliminate the need for an air quality permit. Examples of pollution prevention actions include substituting higher solids type coatings; improving spray coating transfer efficiency through equipment change and operator training; scheduling production so fewer coating changes are needed, and evaluating waste streams to reduce waste generation. The EAO can provide reference material and case studies on how pollution prevention has saved manufacturers money and lowered emissions and waste. Vendors and trade associations can also provide success stories on waste reduction and how the bottom line can be improved.

Remember

- Air quality is protected by federal and state laws and regulations.
- Regulated air pollutants generated by wood furniture manufacturers include dust from wood working and solvent vapors from assembly and finishing operations.
- Common solvents may be Hazardous Air Pollutants (HAPs) which are more stringently regulated than other air pollutants due to their effects on human health.
- An air operating permit may be required of existing and new facilities.
- An air construction permit may be required for a new facility or expanding an existing one.
- Wood furniture manufacturers may be subject to the federal MACT standard regulating HAP emissions.

Pollution Prevention Options

Preventing pollution instead of treating or disposing of waste can save money, protect the environment and reduce risk to people. Here are some suggestions:

- ✓ Prevent spills and clean up spills immediately.
- ✓ Substitute lower solvent materials where possible to reduce air emissions.
- ✓ Investigate coatings with less hazardous solvent content.
- ✓ Consider installing a still to recover solvent from waste coating.
- ✓ Try to schedule production to reduce the number of coating changes and required line and equipment cleaning.
- ✓ Change method of line cleaning to generate less waste solvent.
- ✓ Consider using an enclosed gun cleaner rather than soaking in an open bucket.
- ✓ Evaluate waste in wood working to determine if less waste could be produced through changing production practice or equipment.

For More Information

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Backflow Prevention

It is important to prevent contamination of your business's water supply, whether it is provided by a public water supply or by your own private water well. A "cross-connection" is a physical link connecting a source of pollution or contamination with a potable water supply. "Backflow" is the unwanted reversal of flow in a water distribution system. Backflow through a cross-connection can contaminate the potable water supply in your building, on your block, or throughout the entire water system.

Backflow prevention devices protect the water supply from backpressure and backsiphonage hazards. Backpressure backflow results when contaminated water pressure exceeds the potable water pressure. Backsiphonage backflow results from negative pressure (i.e. water line breaks). Backflow devices are placed on water lines at the point where they enter the building and at points where the water system is connected to a potential source of contamination.

Backflow prevention devices include:

- Airgaps
- Reduced pressure principle backflow prevention assemblies
- Double check valves
- Vacuum breakers
- Barometric loops

The device needed at a particular site depends on the degree of hazard involved, location accessibility and whether the potential backflow is due to backpressure or backsiphonage. If your business is connected to a public water supply, local regulations may require that you install a backflow prevention device to protect the public water supply from backflow hazards within your premises. The backflow prevention assembly must be installed on your water service line. It is a good idea to put additional backflow prevention devices at any location in your business where contamination could occur. Contact your local public water supplier to determine if they have backflow prevention requirements.

If your business is connected to your own private water supply, you should install backflow prevention devices to protect you, your employees and your customers from the risk of contaminated drinking water.

The Missouri Department of Natural Resources maintains a list of approved backflow prevention assemblies. To obtain a copy, call the Environmental Assistance Office at 1-800-361-4827.

Remember

- If possible, eliminate cross-connections from your water system.
- If you are connected to a public water supply system, you may be required to have backflow prevention assemblies or devices.
 - Obtain a copy of your water utility's backflow prevention ordinance and regulations.
 - Install the required backflow prevention devices.
 - Inspect and test backflow prevention devices annually.
- Preventing backflow into your water supply protects you, your employees and your customers.

Additional Information:

“Cross-Connection Control Manual”, EPA 816-R-03-002, February 2003, found at: www.epa.gov/safewater/crossconnection.html.

“Tech Brief – Cross Connection and Backflow Prevention”, National Drinking Water Clearinghouse, found at: www.nesc.wvu.edu/ndwc/articles/OT/WI04/TB_WI04.html.

Missouri Code of State Regulations 10 CSR 60-11.010 Prevention of Backflow found at: www.sos.mo.gov/adrules/csr/current/10csr/10c60-11.pdf.

For More Information

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Dust Collection

Dust is a waste that all wood working operations will have. Managing wastes costs money. State and federal environmental regulations explain what legally can and cannot be done with the waste. The regulations describe proper disposal and how pollution (waste) should be controlled, stored and treated. A properly installed and operated dust collection system has the following benefits for your shop:

- Air emissions are reduced and may result in less regulatory burden.
- There may be a market for dust captured and collected for recycling, turning waste into profit.
- Worker health and safety are improved by keeping dust out of the air and off the floor.
- Liability may be reduced and efficiency increased.
- Equipment wear is reduced and motor life is increased.
- Contaminants are kept out of sawdust so that it can be recycled for beneficial use.
- Sanding belts last longer and sanding is more efficient because dust is not embedded in the belt.
- Better environmental protection may lead to enhanced marketing and public relations opportunities.

Clean sawdust can be used for animal bedding; composting; as raw materials in the manufacturing of particle board, chip core, laminates, and specialty press molded products like sheet stock and shipping pallets. Coarse sawdust can be used as landscaping mulch. However, fine sawdust is not good for mulch because it easily becomes airborne. Hardwood sawdust may be used in pulp and paper mills or for charcoal briquette manufacture but distance from the buyer determines whether this use is available. Clean sawdust may also be used for fuel in some situations, but an air permit may be needed even if not required by your other operations.

Here are a few tips on dust collection.

- Investigate outlets for your wood dust as alternatives to landfill disposal. Your local Solid Waste Management District may help in marketing the collected dust. Use the Internet link below or contact the Department of Natural Resources' Environmental Assistance Office to find your District office.
- If there are other shops in your area, consider joining together to get a purchaser for your waste. The EAO or your local Solid Waste Management District can assist you in this process.
- Sawdust from softwood may need to be segregated from hardwood dust for marketing. This may not be economical depending on the value of the recycled dust.
- If sanding of a painted or varnished product is required, the dust from this operation may have to be landfilled.

- Mixing waste from other operations with sawdust to be recycled may reduce marketability.
- Monitor and inspect dust collection systems periodically and set up a maintenance schedule to avoid problems.

Solid Waste Management Districts link: www.dnr.mo.gov/alpd/swmp/swmd/swmdinfo.htm

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Energy Conservation

Like most small business operators, you want to keep your utility bill low. Whatever you spend on energy -- for lights, heating and air conditioning, refrigeration, water use, and electricity to power office equipment -- cutting your cost boosts your bottom line. This guide sheet will help you find energy savings that make sense for your business.

Managing your energy use will likely lead to increased profitability, which makes energy efficiency smart business. And while you're spending less money, you will be helping the environment by preventing pollution.

The following are a list of simple, reliable, low-risk, high-return energy savers.

- 1) **Turn off lights and equipment when they are not in use.** Seems obvious, but high utility costs often include paying for energy that is completely wasted.
- 2) **Install "occupancy sensors" in spaces that are often unoccupied , including some offices, warehouses, storerooms, restrooms, loading docks, corridors, stairwells, office lounges, and conference rooms.** Occupancy sensors detect the presence or absence of people and turn lights on and off accordingly. They may reduce lighting energy consumption by 50 percent or more in some circumstances.
- 3) **Replace incandescent light bulbs with compact fluorescent lamps (CFLs), wherever appropriate.** CFLs cost about 75% less to operate, and last about 10 times longer. (Review the *Fluorescent Bulbs* guide sheet for disposal information.)
- 4) **Replace T-12 fluorescent fixtures with T-8 or T-5 fixtures with electronic ballast.**
- 5) **Install LED (light-emitting diode) exit signs.** Your current fixture may accept a simple, "screw-in" lighting element to replace the small incandescent bulbs that burn out with frustrating frequency. This string of LEDs costs about \$15 to \$20, lasts decades, gives brighter light, and ends risky ladder climbing to replace bulbs. If your current exit sign will not accept the screw-in lighting element, a new LED exit sign fixture costs about \$100, and saves about 90% over incandescent bulbs' operating costs.
- 6) **Adjust lighting to your actual needs; by using "task lighting" and "daylighting."** The use of localized task lighting allows for lower ambient lighting levels. When there is adequate daylight electric fixtures can be dimmed or turned off completely. Too much light can be as bad for visual quality as too little light and it adds to the utility costs.
- 7) **Buy ENERGY STAR labeled office equipment, and other products, when replacing or purchasing new equipment.** Office equipment that has earned the ENERGY STAR helps eliminate wasted energy through special power management features. When equipment is not in use, it automatically enters a low-power "sleep" mode. An ENERGY STAR qualified computer in sleep mode consumes about 80% less electricity than it does in full-power mode. Overall, ENERGY STAR qualified office equipment uses about half as much electricity as standard equipment.
- 8) **Tune-up your HVAC system with a semi-annual maintenance contract.** Even a new HVAC (heating/ventilation/air-conditioning) system will decline in performance without regular maintenance. The cost for this service varies by local HVAC contractor, but it's likely to save you more than it costs. It automatically ensures "pre-season" system check-ups before each cooling and heating season.

- 9) **Regularly change (or clean if reusable) the HVAC filters.** During peak cooling or heating season, change or clean your filters every month; they cost about \$2-3 each. Dirty filters can cost up to \$5 a month extra, overwork the equipment, and result in dirtier indoor air. Consider purchasing "electrostatic" filters, which are washable, long lasting, and provide cleaner air. Clean or change filters more often if smokers or pollution sources are present.
- 10) **Install a programmable thermostat for your HVAC system.** An "old-fashioned" thermostat turns the HVAC on and off based on temperature, not whether you benefit from the cooling or heating. A solid-state, electronic programmable thermostat can optimize HVAC operation 24/7, based on your needs. For example, instead of heating or cooling all night, so you can enter a comfortable building in the morning, this "smart thermostat" can turn on the HVAC one hour before you arrive, based on your daily or hourly needs.
- 11) **Control direct sun through windows.** During cooling season, block direct heat gain from the sun shining through glass on the east and west sides of the building. Depending on your situation, there are several options such as "solar screen," "solar film," awnings, and vines. Over time, trees can attractively shade the glass and building. Interior curtains or drapes can help, but it is best to prevent the summer heat from getting past the glass and inside. During heating season, with the sun low in the south, unobstructed southern windows contributes to the building heat during the day, but should be covered at night.
- 12) **Paint ceilings and side walls with a white semi-gloss paint.** This will enhance the lighting quality at most work stations by raising the brightness levels and softening shadows and glare whether light is from electric fixtures or from the sun.
- 13) **Use fans.** Comfort is a function of temperature, humidity, and air movement. Moving air can make a somewhat higher temperature and/or humidity feel comfortable. Fans help delay or reduce the need for air-conditioning. They allow you to raise the temperature 3-5 degrees. Each degree of higher temperature saves about 3% on cooling costs.
- 14) **Plug or fill any cracks or air leaks with weather-stripping and caulking.** Look for cracks around windows, doors, utility switches or outlets, and any other gaps between the inside and the outside.
- 15) **Ensure building maintenance and cleaning staff are enthusiastic about savings and adopt work habits that support energy efficiency.**
- 16) **Assign one person to review and track utility usage and cost.** This person should provide education to all employees on the energy savings efforts at the work place. A good energy savings program will involve all employees and encourage suggestions on energy savings opportunities.

If you feel you need additional assistance on evaluating ways to reduce utility costs contact your utility company, local engineering firms or an energy service company (ESCO). These companies can provide an in depth energy audit of your facility and identify the most economical energy savings measures to implement. You may also contact the Missouri Energy Center in the Department of Natural Resources at 1-800-361-4827 for help.

For additional information see the following web sites.

www.energystar.gov/smallbiz

www.rebuild.org/sectors/commercial/

www.eere.energy.gov

www.aceee.org

For More Information

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Finishing Operations

Applying finishes to parts and assembled furniture is the main source of air pollution emissions in the wood furniture manufacturing industry. Traditional finishes contain solvents, usually in high concentrations for fast drying. The most common coating application method is with traditional high pressure spray guns and over spray is often significant. Over spray is waste that does not reach the work piece. Solvents contained in coatings and used for equipment cleaning usually are volatile organic compounds (VOCs) and many are also hazardous air pollutants (HAPs). See the VOCs and HAPs guide sheet for more on these chemicals. Pollution prevention practices include changes in materials, equipment and work practices. Your business will benefit from:

- improved working conditions for better employee health and safety;
- reduced regulatory burdens and liabilities;
- reduced waste disposal cost;
- improved public image and acceptance;
- decreased raw material use and lower cost;
- and reduced waste management costs.

Operating Practice

Transfer efficiency is very important in spray finishing operations. Efficiency is highly dependent on the painter's technique. There are training schools available to improve spray operators' transfer efficiency. Some experienced painters have increased their efficiency by one third, and less experienced painters may show even more improvement. Training is the best investment you can make to improve your bottom line by reducing coating use, improving product quality and reducing reworks. Some companies have video taped operators as part of their training to help them improve. Check with your trade association or local trade school about training.

Scheduling jobs may or may not be possible in your shop. Changing finishes for a new job could result in cleaning equipment and lines. Scheduling as much as possible of one type and color of finish minimizes cleaning between jobs. Some shops can afford to dedicate a spray booth to one type of finish thus alleviating the problem with cleaning between jobs.

Equipment Changes

Conventional spray equipment may be replaced by airless, air-assisted or high volume-low pressure (HVLP) guns with improved transfer efficiency. Flat pieces may be roll coated for almost 100% transfer efficiency. Forced air drying systems may allow use of high solids, low solvent coatings. Simple, highly repetitive tasks might be handled by automation.

Material Changes

Substitutes are available for traditional high solvent coatings to reduce air emissions. Test products to determine if you can produce acceptable quality without making major changes. Not all coatings work in all spray equipment and any necessary equipment changes must be evaluated along with coating changes. High-solids coatings require less material, have higher

transfer efficiency, but require a different spray gun. Ultraviolet (UV) coatings have very high transfer efficiency but special equipment is required to cure the coating. UV coatings can only be used on certain types of parts. Water borne coatings clean up with soap and water. Your suppliers can provide you with examples of shops using these coatings for you to check advantages and disadvantages of switching. Look for a supplier that is able to let you test with your application before you buy.

Remember

- Finishing operations are the largest source of air pollution emissions in wood furniture manufacturing and associated waste management costs can be significant.
- Reducing usage of solvent based coatings through improved operational practice, material change or equipment change saves money, improves worker health and safety, and benefits the environment.

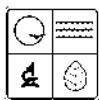
Pollution Prevention Options

Preventing pollution instead of treating or disposing of waste can save money, protect the environment and reduce risk to people. Here are some suggestions:

- ✓ Train employees in principals and practices of waste prevention.
- ✓ Keep coating containers closed when not in use to minimize solvent evaporation.
- ✓ Limit access to coatings and solvents.
- ✓ Purchase only the amount you need.
- ✓ Mix only as much coating as needed.
- ✓ Adjust coating viscosity with heat instead of thinner when possible.
- ✓ Use coatings with the lowest VOC and HAP content possible.
- ✓ Reuse solvents until they don't do the job, then recycle if possible.
- ✓ Train employees in waste reduction relating to purchasing, storing, mixing and applying coatings and cleaning equipment.
- ✓ Consider purchasing an enclosed gun washer to clean spray equipment rather than using a bucket of solvent.
- ✓ Try more efficient spray equipment like HVLP, airless or air-assisted with your finishes to reduce your coating usage.
- ✓ Test lower solvent substitute coatings to see if they work for your shop. If so, make the switch and reduce air emissions and possibly regulatory burdens.
- ✓ Employee training is your best investment to improve efficiency and productivity, reducing waste.

For More Information

Missouri Department of Natural Resources
Environmental Assistance Office
P.O. Box 176
Jefferson City, MO 65102-0176
1-800-361-4827 or (573) 526-6627
www.dnr.mo.gov/oac/env_assistance.htm



Floor Cleaning

Floor cleaning at businesses can have an environmental impact, depending on the cleaning methods used. Floor cleaning is also important from a customer relations standpoint.

The most important step in preventing environmental problems from floor cleaning is to prevent spills. Use drip pans to catch fluid spills. Place wastes to be disposed of or recycled in proper containers. If you do have a fluid spill, clean it up immediately with the appropriate absorbents.

The first cleaning step should be to sweep the floor to remove loose, dry materials. If you have allowed hazardous materials to fall on the floor, it is possible that these sweepings could be hazardous waste. For example, coatings may contain hazardous solvents such as xylene. If these spills are mixed with floor sweepings, the sweepings could be contaminated and become hazardous waste.

Sweepings that are contaminated with hazardous materials will have to be tested. They will require special management and disposal if they are found to be hazardous. See the *Hazardous Waste* guide sheet for more information.

When washing the floor, do not use caustic cleansers or solvents that can cause damage to a public sewer and treatment system or to a private septic system. Biodegradable soaps are available and are usually gentler on both these systems. Be particularly cautious if your shop is not connected to a public sewer system. Some cleaning chemicals and solvents can seriously damage septic systems.

If your facility is connected to a public sewer and wastewater treatment system, contact the treatment facility. Tell the facility operators about the materials you handle and ask if they can accept your wastewater. There may be local regulations restricting what you can pour down the drain and discharge into the sewer system.

Do not discharge wash water to the outdoors. If you release wastewater off your property, you could be in violation of Missouri's laws.

Avoid hosing off the floor when dry sweeping is possible. Hosing off the floor uses a great deal of water, creates a greater risk of pollution and is not always effective.

Remember

- If listed hazardous wastes are mixed with floor sweepings, all of the material becomes hazardous waste.
- Contact local sewer plants to find out about local requirements for wastewater discharged to them.
- Do not discharge wastewater outdoors.

Pollution Prevention Options

Preventing pollution instead of treating or disposing of waste can save money, protect the environment and reduce risk to people. Here are some suggestions:

- ✓ Prevent spills and clean up spills immediately.
- ✓ Pre-clean the floor with a dry broom.
- ✓ Use biodegradable soap and water to do final cleaning.

For More Information

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Fluorescent Bulbs

Many people use fluorescent lights. Fluorescent bulbs contain toxic metals such as mercury, cadmium and lead. Unbroken lamps pose no threat to human health and the environment and may be managed as a universal waste. However, when fluorescent bulbs are broken, people may be exposed to toxic levels of mercury vapor and other metals which can be easily inhaled.

The Missouri Department of Natural Resources encourages prudent lamp recycling to safeguard human health and to limit the amounts of toxic heavy metals entering the environment.

If your business generates one or two lamps infrequently, and you are a conditionally exempt small quantity generator of hazardous waste, you may dispose of these in a Missouri sanitary landfill. Before disposal, place the lamp into the box the replacement lamp came in, put the box into a plastic bag and secure the bag at the top before placing it into the dumpster. If the lamp does not have a box you can double bag the lamp. These precautions will help keep the bulb from breaking right away and will help protect you and the trash hauler.

To better protect the environment, the department encourages you to send your lamps to a certified recycler.

Non-hazardous Lamps

If you know your fluorescent lamps are non-hazardous you may send them to a Missouri sanitary landfill or to a lamp recycler. You should contact the landfill operator for permission before disposal. The landfill operator can refuse to accept the waste. The landfill may require a special waste disposal request before accepting the material.

Lamps Sent for Recycling

Businesses in Missouri may send their **unbroken** lamps to a recycler in Missouri that has resource recovery certification from the Department of Natural Resources or to an out-of-state recycler. If unbroken lamps are sent for recycling, you do not need to use a licensed hazardous waste transporter in Missouri. You may use a hazardous waste manifest or other shipping papers to record and track your shipments of unbroken lamps, but this is not required.

Hazardous **unbroken** lamps sent for recycling need to be handled as universal waste. In general, the following practices should be observed:

- Label containers with the words "Universal Waste-Mercury-Containing Lamp(s)," "Waste Mercury-Containing Lamp(s)," or "Used Mercury-Containing Lamp(s)."
- Do not store waste lamps for more than one year.
- Train employees on proper handling and emergency procedures.
- Ship the bulbs per Department of Transportation requirements.

If you intend to send hazardous lamps to an out-of-state recycler, you should contact the environmental agencies in the states through which the lamps will travel for their state

requirements. Other states may require use of a licensed hazardous waste transporter and a manifest for shipments to a recycler even though Missouri does not.

Hazardous Lamps

Your fluorescent bulbs are subject to hazardous waste regulations if:

1. They are broken OR
2. They are identified as hazardous and are sent to a facility for treatment, storage or disposal.
(See the *Hazardous Waste* guide sheet, for more information.)

There are two ways to determine if lamps are hazardous.

1. Test the waste. The test for determining the toxicity of fluorescent lamps is the toxicity characteristic leaching procedure (TCLP). If the level of any metal is at or above the acceptable level, the lamps are hazardous waste. Acceptable levels are published in the *40 Code of Federal Regulations 261.24* as follows:
 - Mercury - 0.2 milligrams per liter (mg/l)
 - Cadmium - 1 mg/l
 - Lead - 5 mg/l
2. Apply knowledge of the hazardous characteristic. Data from lamp manufacturers shows that traditional fluorescent lamps are likely to be hazardous waste. If you wish, you may assume the lamps are hazardous to avoid the costs of testing. However, your disposal firm may require test results before taking your lamps.

The hazardous waste regulations you must meet depend on how much waste you generate. It may be helpful to know that 350 of the standard 4foot long lamps weigh about 220 pounds. If you have over 220 pounds of hazardous waste in a month or at any one time you are regulated as a small quantity generator. See the *Hazardous Waste* guide sheet for more information.

Low-mercury lamps are available. Ask your lamp supplier for information.

Remember

- Fluorescent bulbs may be hazardous waste.
- Unbroken fluorescent bulbs can be sent to a bulb recycler.
- Do not break fluorescent bulbs.

Pollution Prevention Options

Preventing pollution instead of treating or disposing of waste can save money, protect the environment and reduce risk to people. Here are some suggestions:

- ✓ Purchase low-mercury bulbs.
- ✓ Protect bulbs from breakage.
- ✓ Recycle bulbs.

For More Information

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Hazardous Waste

Most furniture manufacturers generate hazardous waste. Typical hazardous wastes include spent solvents; waste adhesives and coatings; unused out-of-date adhesives, coatings and solvents; and possibly paint booth filters. It is very important that you find out whether your wastes are hazardous and that you follow the law when managing the wastes.

What is a Hazardous Waste?

A waste is a material that you no longer use and will discard. It can be a solid, liquid or gas. A waste is hazardous if it has properties that could be dangerous to human health and the environment.

It is **your** responsibility to find out whether your waste is hazardous. A waste is hazardous if:

- it is listed as a hazardous waste in the federal regulations;
- it exhibits a hazardous characteristic;
- it is a hazardous waste by Missouri law; or
- it is a mixture of a listed hazardous waste and any other waste.

Listed Hazardous Waste

The federal government publishes lists of hazardous wastes. There are four different lists: the F list, the K list, the P list and the U list. Wastes that are on the P list are called "acutely hazardous" and are regulated more strictly than the other types.

Characteristic Hazardous Waste

Some wastes that are not on the lists may still be regulated hazardous wastes because they have characteristics that make them hazardous. There are four characteristics:

- **Ignitable** - A waste with a flashpoint of less than 140° F, or solids that catch fire easily and burn so rapidly they create a hazard. Some solvents are ignitable.
- **Corrosive** - A waste with a pH less than or equal to 2.0 or greater than or equal to 12.5.
- **Reactive** - Wastes that are normally unstable, react violently with water, can explode or release poisonous gases.
- **Toxic** - Wastes with high concentrations of certain organic chemicals, heavy metals or pesticides when tested by the toxicity characteristic leaching procedure (TCLP). Federal regulations contain a list of toxic chemicals.

Missouri-specific Hazardous Waste

An individual state can regulate wastes as hazardous even if they are not on the federal list. For example in Missouri certain dioxin wastes are regulated at smaller quantities than in the federal rules.

Mixed Waste

If you mix any waste with a waste that is on the F, P, K, or U list, all of it is hazardous, even if there is only a very small amount of listed hazardous waste in the mixture. For example, if you put a cup of waste xylene in with 55 gallons of water, you will have a little over 55 gallons of hazardous waste.

Is Your Waste Hazardous?

To find out if your waste is hazardous, check to see if it is on the lists of hazardous wastes or if it is a hazardous waste in Missouri. If it is not, you need to find out if it exhibits one or more of the hazardous characteristics. Check the material safety data sheet (MSDS) or contact your supplier for information. The manufacturers of your adhesives, coatings and solvents may be able to tell you whether the used

material is hazardous waste. If you can't find the information another way, you will need to test your waste.

If you are unsure if your waste is hazardous, you will need to have it tested in a laboratory. The test used is called the toxicity characteristic leaching procedure (TCLP). There are many laboratories that can do this test. Check your phone directory or ask your trade association for suggestions. Contact the Department of Natural Resources' Environmental Assistance Office at 1-800-361-4827 for help with this.

Managing Hazardous Wastes

There are very specific requirements for managing hazardous waste from your business. The requirements you must meet depend on what and how much waste you generate. You need to know how much acutely hazardous waste (P-listed) and non-acute hazardous waste you generate each month. You also need to know how much of each of these types of waste you accumulate at any one time.

Use the following information to determine your generator status. See the *Hazardous Waste Management* guide sheet for more information on how to label, store and dispose of your hazardous waste.

What Type of Generator Are You?

There are three types of generators: Large Quantity Generator (LQG), Small Quantity Generator (SQG) and Conditionally Exempt Small Quantity Generator (CESQG). Here are some general guidelines to help you decide what type of generator you are:

If you generate in one month or accumulate at any one time . . .

- more than 1 kg (2.2 pounds) of acutely hazardous waste you are an LQG.
- 1,000 kg (2,200 pounds) or more of non-acute hazardous waste you are an LQG.
- more than 100 kg (about 220 pounds), but less than 1,000 kg (2,200 pounds) of non-acute hazardous waste AND less than 1 kg of acutely hazardous waste you are an SQG.
- no more than 100 kg (220 pounds) of non-acute hazardous waste AND less than 1 kg of acutely hazardous waste you are a CESQG.
- In Missouri, anyone generating one gram or more of dioxin waste (2,3,7,8-tetrachlorodibenzo-p-dioxin) is an LQG.

If you are a SQG or LQG you must register with the department and get a generator identification number. You also must follow regulations on storage, transport, record-keeping and reporting. Call the department for more information.

Note: The federal requirements for hazardous waste can be found in the *Code of Federal Regulations*, Title 40, Part 260 through Part 280 (40 CFR 260-280). The Missouri Hazardous Waste Law is in the *Revised Statutes of Missouri* (RSMo), Sections 260.350-260.552. The hazardous waste rules are in the *Code of State Regulations*, Title 10, Division 25 (10 CSR 25). To get information on the regulations, call the Missouri Department of Natural Resources at 1-800-361-4827.

Remember

- You are responsible for determining if your waste is hazardous.
- You will need to register as a generator if you are a SQG or a LQG.

For More Information

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Hazardous Waste Management

If you generate hazardous waste, and most wood furniture manufacturers do, there are requirements for how you manage that waste. The rules you must follow depend on how much waste you generate. This guide describes the main requirements. For information on how to decide if your waste is hazardous, see the *Hazardous Waste* guide sheet.

This list does not include every requirement for every generator. It is general guidance for large quantity generators (LQG) and small quantity generators (SQG).

Containers

- Hazardous waste containers must be in good condition. If a container leaks, transfer waste to a new container and properly clean up the spill.
- Don't let rainwater accumulate on top of the container.
- Keep containers closed and use self-closing funnels when adding waste.
- Use containers that are compatible with the waste. For example, use HDPE (high-density polyethylene) plastic containers for corrosive wastes.
- Never place incompatible wastes, such as wastes that react with each other (acids and bases) in the same container.

Storage

- Keep aisle space between container rows to allow inspection for leaks and damage.
- Store ignitable and reactive wastes at least 50 feet from property boundaries.
- Store containers of incompatible wastes in separate areas.
- There are limits on how long you can store your waste.

Labels

- Label every container with the type of waste and whether it is hazardous or non-hazardous.
- Include EPA hazardous waste numbers or Missouri waste code numbers.
- Include the date waste was first placed in the container and the date the waste first goes to storage.
- Include your business's name and address.
- Use the following words on labels for hazardous wastes:

HAZARDOUS WASTE

FEDERAL LAW PROHIBITS IMPROPER DISPOSAL

If found, please contact the nearest police or public safety authority or the U.S. EPA
(Your business's name and address and manifest document number)

Transport and Disposal

- Make sure your hazardous waste transporter has an EPA identification number and a Missouri Hazardous Waste Transporter License.
- Make sure the place receiving your waste has EPA identification numbers and the necessary state permits.
- Always use manifests for hazardous wastes shipped off-site.

Inspections and Record keeping

- Inspect containers at least once a week and keep a written log of inspections.
- Keep training and inspection records, manifests, shipping receipts and records of lab tests for three years.
- Keep land disposal restriction forms for five years.

Training

- Train all employees to identify, reduce and properly handle wastes.
- Train new employees before they handle hazardous waste.

Notify Department of Natural Resources

- If your business is a small or large quantity generator, register as a generator with the Missouri Department of Natural Resources to get an EPA and Missouri generator identification number.

Emergency Preparedness

- Inform police departments, fire departments and local hospitals of the hazardous wastes that are on your property.
- Designate an emergency coordinator. This person must know what to do in case of a fire, spill or other emergency and must be on the premises or on call 24 hours a day.

Contingency Plans

Large quantity generators must have a written plan for handling emergencies that includes the following. Even if you are not a large quantity generator, having a written plan is a good idea.

- Response arrangements with police, fire, hospitals and emergency response contractors.
- Emergency coordinator's address and phone number(s).
- On-site emergency equipment descriptions and locations.
- Evacuation plan and routes, including a site diagram.

Post Emergency Information

Post the following information near every telephone:

- Fire department phone number.
- Emergency coordinator's name and phone number.
- Fire alarm and extinguisher locations.
- Locations of spill control materials.

Remember

- You must decide whether your waste is hazardous and manage it correctly.
- Find ways to eliminate or reduce hazardous wastes. This will reduce the number of requirements you must meet. See the pollution prevention suggestions on other guide sheets, particularly those dealing with waste adhesives, coatings and solvents.

For More Information

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Maximum Achievable Control Technology

Federal regulations set air emission standards called the national emissions standards for hazardous air pollutants (NESHAPs) and maximum achievable control technology (MACT) standards. These standards apply to specific industries that are major sources of hazardous air pollutants (HAPs). The wood furniture manufacturing MACT standard may apply to your business if you use solvent-based finishes and contact adhesives and make any of the following wood furniture products (SIC code in parentheses):

- Wood kitchen cabinets (2434)
- Wood household furniture (2511 and 2512)
- Wood television, radio, phonograph and sewing machine cabinets (2517)
- Household furniture, not elsewhere classified (2519)
- Wood office furniture (2521)
- Public building and related furniture (2531)
- Wood office and store fixtures, partitions, shelving and lockers (2541)
- Furniture and fixtures, not elsewhere classified (2599)
- Furniture stores (5712)

The MACT standard may also apply if you make other products, in addition to wood furniture, that are not in one of those SICs when your other operations emit HAPs above major source levels. This is known as incidental furniture manufacturing.

Major Source

The MACT standard applies to facilities that are major sources of HAP emissions. To determine if you are a major source, you must first determine your HAP emissions. For proposed new plants, the process is the same, except it is applied to the forecast materials use. If you expand a plant not subject to the MACT standard, you will need to go through the process to determine if the expanded business must comply with the MACT standard.

The manufacturer of the materials you use will furnish certified product data sheets (CPDS) showing HAP content of their products. If you have questions, contact the manufacturer, the Environmental Assistance Office (EAO) or another environmental professional for help. A few commonly found HAPs are toluene, xylene, methylene chloride, methyl ethyl ketone and methanol.

Whether you are a major source is determined by calculating theoretical emissions of HAPs, called the potential to emit (PTE). This calculation estimates emissions as though you operated at your maximum capacity for 24 hours a day, 365 days a year (8760 hours a year). An exception is when there is a construction permit for the entire plant with a limit on HAP emissions. The permitted emissions limit then becomes your PTE. If you do not have such a permit, estimate how much of each HAP-containing material would be used in 8760 hours at maximum output. Then apply the HAP content from the CPDS (for each product) to determine

how many pounds of each HAP chemical you would theoretically emit. This is your PTE for HAPs. Contact the EAO or another environmental professional for help with this process.

You are a major source of HAPs if your PTE is equal to or greater than 10 tons of any individual chemical (such as xylene) or if your combined PTE for all HAPs is equal to or greater than 25 tons per year. If you are below these thresholds, you are an **Area Source** and are exempt from further requirements of the MACT standard, except for record keeping documenting that usage stays below the exemption level. Also, if you use less than 250 gallons per month (3000 gallons in any 12- month period) of finishing materials, contact adhesives, cleaning solvents and washoff solvents, you are exempt, except for record keeping.

Applicability Date

New major sources (based on estimated PTE) must comply with the MACT standard from startup date. Sources existing before Jan. 1, 1996 were to comply with the standard no later than Dec. 7, 1998, or have limited their usage or emissions to the Area Source exempt level.

What is required to comply?

Notification

Initial notification was required of all major sources which existed before Jan. 1, 1996, and the notification should have been filed no later than Sept. 3, 1996. Any planned new major source is required to notify the Missouri Department of Natural Resources, Air Pollution Control Program of their intent to construct by filing an application for authority to construct. If you operate an existing major source that is subject to this standard, and you did not submit initial notification you must immediately notify the air program. The following information is required in the notification:

- The name and address of the owner or operator.
- The physical location/address of the business.
- A statement that 40 CFR Part 63, Subpart JJ applies to the business.
- A brief description of the nature, size, design and method of operation of the source, including the operating design capacity and identification of each point where a HAP is or is expected to be emitted.

Contact the air program in Jefferson City by calling the toll-free number listed below to find out if pre-printed notification forms are available. If you need assistance with the notification, contact the EAO or another environmental professional.

Control HAP emissions

The MACT standard names three methods for controlling HAP emissions to meet requirements. One or more of these may be used to comply with the MACT standard limitations.

- Use coatings and solvents with lower HAP content (compliant materials).
- An emission control device can be installed to capture and destroy HAP vapors.
- Use a combination of compliant and non-compliant materials that average to the allowable HAP limit.

If you use a control device, you must demonstrate with a performance test that it captures and destroys sufficient HAPs to meet the standard. Notify the air program at least 60 days before conducting this test so that a qualified observer may witness the test. Also, a control device does not need to serve all coating operations. The HAP emission reductions from using a

control device on a portion of your operation can be averaged with non-compliant coating operations to meet the MACT standard prescribed limit.

Space does not permit listing the emissions limits of the standard. Your supplier may have that information and be able to furnish compliant materials so contact them first. When compliant materials can do the job, that is the least expensive way to comply. You may also contact the department's Environmental Assistance Office at the toll-free number listed below for the emissions limits.

Reporting and Record Keeping

The standard requires keeping records documenting compliance. These records must be retained for five years. Periodic reports are required of major sources. Area sources may be required to submit a yearly emissions inventory questionnaire (EIQ) and pay emission fees if they are required to have an operating permit. See the *Air Quality Permits* guide sheet in this publication for more information.

Work practice plan

Major sources are required to have a work practice plan prepared that outlines the procedures your business will use to ensure and document compliance with the standard. For details on what must be in the plan and how to use it, contact the EAO. Even if you are an area source, you may want to prepare such a plan to insure you remain an area source.

Operating Permit

Businesses subject to the MACT regulation must obtain an operating permit from the Air Pollution Control Program. This permit is required of both existing and new major sources. For new sources, this is in addition to the requirement to obtain a construction permit before starting construction. See the *Air Quality Permits* guide sheet in this publication for more information.

Remember

- Many adhesives and coatings used in wood furniture manufacturing contain hazardous air pollutants (HAPs).
- Many common solvents are HAPs.
- Federal regulations require reduction of emissions of these chemicals to the air.
- You must determine if your business is a major source of HAP and subject to the federal maximum achievable control technology standard.
- Your usage of HAP containing materials determines whether the standard applies to you.
- Record keeping is required whether you are a major source or not.
- Reducing emissions of toxic HAPs through changes in materials or work practices improves worker health and safety as well as benefits the environment.

For More Information

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Paint Booth Filters

Used paint booth filters may be hazardous waste. Coating and solvent captured by a filter can cause the used filter to be a hazardous waste depending on what you use and how much coatings you apply.

Usually filters are hazardous because they contain a toxic metal (usually from the coating), they are ignitable (can burst into flames) or they are contaminated with a listed hazardous waste (often from spraying solvent into the filter when cleaning paint guns).

To decide if your paint booth filter is hazardous ask yourself the following:

- Does the material safety data sheet (MSDS) show that the coating or other chemicals going into the filter contains toxic metals (particularly cadmium, lead, barium or chromium) or other toxic materials? If the answer is yes, it is very possible that your filters are hazardous waste. You can assume your filters are hazardous or you can do testing.
- Can your supplier or manufacturer provide information to you that says your coatings or other chemicals going into the filters contain no toxic material? If the answer is no, you should find out the levels from them or do testing.
- Is the coating or solvent going into the filters a listed hazardous waste? If the answer is yes, the used filters will be hazardous waste. Some listed hazardous waste solvents are trichloroethylene, toluene, xylene, acetone, methyl ethyl ketone, and methylene chloride.
- Could the used filters spontaneously combust (catch on fire without anyone or anything lighting them)? If the answer is yes, the filters are hazardous waste.

Some people dip their used filters in water before storing them to prevent fires. Others spray them with water. If you do not need to take measures to prevent fire, they are probably not ignitable hazardous waste. They could still be hazardous waste for another reason (toxic or listed hazardous waste contamination). If your filter contains a listed hazardous waste and you dip it into water, the water it becomes hazardous waste.

Testing Paint Booth Filters

To test your paint booth filter, a laboratory will need to measure the flash point, determine if the filter can spontaneously combust and do a toxicity characteristic leaching procedure (TCLP). The TCLP will only need to test for the toxic chemicals that you expect to find in the filter.

The list of regulated toxic chemicals is in the *Code of Federal Regulations*, 40 CFR 261.24. Call the Missouri Department of Natural Resources' Environmental Assistance Office (EAO) if you need help finding this list.

To find a laboratory to test your filters for hazardous characteristics, check the yellow pages, ask your vendor or check with your trade association. Be sure the filter is full when it is tested.

Once you test the filters, you need to test them again when your process changes, for example if you change coatings or solvents.

Managing Hazardous Waste

If your filters are hazardous waste, you will need to figure out how much waste you generate. The regulations you must follow depend on how much hazardous waste you generate. A few of the basic requirements are discussed here. See the *Hazardous Waste* and *Hazardous Waste Management* guide sheets for more information.

Properly store and dispose of used filters. During storage in the accumulation area, they need to be in a closed container clearly marked with the words "Hazardous Waste" and the date you first put waste into the container. Be sure you store them in a way that will prevent fires. When the container is moved to the hazardous waste storage area, additional requirements need to be met. The date needs to be changed to the date the container goes to storage and the proper DOT labels and markings need to be added.

Anyone transporting your hazardous waste must have a Missouri hazardous waste transporter license. There are several types of facilities that can accept hazardous paint booth filters. Always check to be sure that the facility receiving your waste can legally accept it.

To get a list of hazardous waste facilities in Missouri, contact the EAO at 1-800-361-4827.

Remember

- Paint booth filters may be hazardous waste. You must find out if yours are.
- If you clean your guns by spraying a listed hazardous waste solvent into your paint booth or filter, your filters become hazardous waste. Spray solvent into a container and reuse it.
- If your paint booth filters are hazardous waste, you must follow hazardous waste regulations. See the *Hazardous Waste* guide sheet.
- Store used paint booth filters safely to prevent fires. If you dip them in water, realize that the water will become hazardous waste if the filters are hazardous waste.
- Use non-hazardous coatings and solvents.

Pollution Prevention Options

Preventing pollution instead of treating or disposing of it can save money, protect the environment and reduce risk to people. Here are some suggestions:

- ✓ Clean your paint gun by spraying solvent into a container. Reuse the solvent.
- ✓ Better yet, consider using a paint gun cleaner.

For More Information

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Painting/Staining/Sealing/Top Coat Waste

Waste coatings, such as paints, stains, sealers and topcoats, may be regulated as hazardous waste. Some coatings contain metals such as lead, cadmium, barium or chromium that cause it to be toxic hazardous waste. Your coatings may also be an ignitable waste, which means they will catch fire at less than 140°F. The temperature at which something catches fire is called the flash point.

The Material Safety Data Sheet (MSDS) for the coating should list the flash point. It should also list toxic metals if they are present in significant amounts. Even if the MSDS does not list any toxic metals, the paint could still be hazardous waste. Check with your supplier or manufacturer. The regulated levels of some of the more common toxic metals are:

- Barium 100 mg/l (milligrams per liter)
- Cadmium 1.0 mg/l
- Chromium 5.0 mg/l
- Lead 5.0 mg/l

If the concentration of metals in your paint is at or above these levels, it is hazardous waste. If the MSDS, the supplier or some other authority cannot tell you whether the waste coating is hazardous, you will need to have it tested before disposal. The test for toxic metals is called the toxicity characteristic leaching procedure (TCLP). See the *Hazardous Waste* guide sheet for more information. You need to test a representative sample of the waste. Be sure to test again if the coating formulation changes.

Keep the coating waste separate from solvent waste. If you mix coating waste with a listed hazardous waste solvent, the entire mixture will be hazardous waste. Some common listed hazardous waste solvents include methyl ethyl ketone, toluene, trichloroethylene, methylene chloride, xylene, and acetone.

Try to avoid having waste coating. Computerized mixing systems can help assure accurate color matching. Using the smallest paint cup practical reduces the amount of paint left in the cup. If you have off-spec coatings, ask your supplier to take it back. Try to use up the coating rather than disposing of it.

Disposing of Hazardous Coating Waste

If your waste coating is a hazardous waste, you need to figure out how much you generate. The rules you must follow depend on how much hazardous waste you generate. In the accumulation area store the hazardous waste in a closed container labeled with the words "Hazardous Waste" and the date the waste was first placed in the container. When the container is moved to the hazardous waste storage area, additional requirements need to be met. The date needs to be changed to the date the container goes to storage and the proper DOT labels and markings need to be added.

Anyone picking up your hazardous waste for disposal or recycling must have a Missouri hazardous waste transporter license. You may need a generator identification number and you may have to complete a hazardous waste manifest. See the *Hazardous Waste Management* guide sheet for more information.

Always check to be sure that the facility receiving your waste can legally accept it. To get a list of hazardous waste disposal facilities in Missouri, contact the Environmental Assistance Office at 1-800-361-4827.

Disposing of Non-hazardous Coating Waste

If your coating waste is not a hazardous waste, you can dispose of it with your trash if the paint is dry. Landfills in Missouri cannot accept liquids. Check with your landfill to see if they will accept the waste.

To dry the non-hazardous coatings, mix absorbent material into it to soak up all the liquid. Kitty litter and sawdust are good absorbents that are inexpensive. Make sure the coating will not react with the absorbent.

You may have heard that you can dry the coating by letting it evaporate. This is never a good idea and may be illegal. Allowing paint, stains, sealers, or topcoats to evaporate like this causes air pollution and poses a risk to anyone around the drying paint. Using an absorbent to dry it quickly is safer and is inexpensive.

Do not put chemicals down the drain unless you have permission from the wastewater treatment plant.

Never pour waste onto the ground. Doing that can seriously harm the environment and you. Also, there are penalties for illegally disposing of waste.

Remember

- Your coatings may be a hazardous waste. You must find out if they are.
- Keep coating waste separate from other wastes.
- Be sure that anyone taking your hazardous waste is legally able to do so.
- Never pour wastes onto the ground.

Pollution Prevention Options

Preventing pollution instead of treating or disposing of it can save money, protect the environment and reduce risk to people. Here are some suggestions:

- ✓ Ask your vendor for coatings that will minimize hazardous waste.
- ✓ Mix only the amount of coating needed. Use all that you mix.
- ✓ Clean your paint gun by spraying solvent into a container. Reuse the solvent.
- ✓ Better yet, consider using a paint gun cleaner.
- ✓ Reduce coating waste in production by training, changing equipment or coatings as discussed in the *Finishing Operations* guide sheet in this publication.

For More Information

Missouri Department of Natural Resources
Environmental Assistance Office
P.O. Box 176
Jefferson City, MO 65102-0176
1-800-361-4827 or (573) 526-6627
www.dnr.mo.gov/oac/env_assistance.htm



Shop Towels

Discarded shop towels or rags, either cloth or paper, may be contaminated with hazardous wastes. If they are, the towels or rags may be hazardous waste.

Listed hazardous wastes include solvents such as methyl ethyl ketone, toluene, xylene, and others. A waste can also be hazardous if it is toxic, ignitable, reactive or corrosive. This type of waste is called a characteristic hazardous waste. See the *Hazardous Waste* guide sheet for more information on what wastes are hazardous.

Any waste that is mixed with a listed hazardous waste becomes a hazardous waste. Towels with a listed hazardous waste on them become hazardous waste themselves when you discard them. The towels could also be characteristic hazardous waste if they are ignitable.

The best way to deal with this issue is to prevent the problem. If you use non-hazardous cleaning solvents, the solvent won't cause the towel to become hazardous. Less volatile solvents like mineral spirits might be effective and not produce ignitable hazardous waste.

If used towels or rags are laundered and reused, they are not regulated as a solid waste or as a hazardous waste. You should tell your laundry what chemicals are on the shop towels and make sure they can handle that type of material.

If you wash your own shop towels, be sure to check with your wastewater treatment plant to find out whether they can accept the wastewater discharge you are putting down the drain. You may need to pretreat your wastewater. Do not launder contaminated shop towels if the wastewater does not go to a treatment plant.

Do not launder towels or rags used to clean up spills of hazardous waste. If you use shop towels to clean up spills of listed hazardous waste, the shop towels are hazardous waste and must be disposed of at a permitted hazardous waste treatment, storage or disposal facility.

If you plan to throw away dirty shop towels or rags, you need to find out whether they are hazardous waste. If the shop towels are hazardous, you must comply with the regulations for management, storage, transport and disposal of hazardous waste.

If your used towels are non-hazardous, you may send them to a sanitary landfill. Landfills cannot accept liquids, so be sure to collect and use or dispose of properly any liquid from your shop towels.

Remember that oily or solvent-soaked towels can catch fire easily. Store them safely. Some people spray the rags with water to prevent fires.

Remember

- Shop towels used to clean up spills of listed hazardous waste must be managed as hazardous waste.
- Shop towels contaminated with listed hazardous waste are hazardous waste.
- If dirty shop towels are laundered and reused, they are not waste. Let the laundry know what type of solvents or other materials are on the dirty towels.
- Do not wash your dirty shop towels unless the wastewater goes to a wastewater treatment plant. Check with staff at the treatment plant to be sure it can handle the wastewater.
- If you are throwing away contaminated shop towels, you must find out whether they are hazardous waste and follow the regulations that apply. See the *Hazardous Waste* guide sheet.

Pollution Prevention Options

Preventing pollution instead of treating or disposing of waste can save money, protect the environment and reduce risk to people. Here are some suggestions:

- ✓ Use non-hazardous cleaners and solvents when possible.
- ✓ Do not use shop towels to clean up spills of hazardous materials. Use drip pans to prevent spills and appropriate absorbents for cleanup.
- ✓ Use the least amount of solvent needed.
- ✓ Collect and recycle solvents from contaminated shop towels. You can use a wringer to remove the liquid or simply allow the towels to drain over a container. Reuse solvents if possible.

For More Information

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Solid Waste

Wood waste can be costly for companies to manage. There are storage requirements, disposal costs and environmental concerns that must be considered. This guide sheet addresses several options that should be considered before sending wood waste to your local permitted landfill for disposal.

Reduction

Increasing yield from raw materials and decreasing the number of rejected parts will reduce the amount of wood waste generated at your shop. Keeping materials such as wood, laminates, and particle board protected from the elements will increase yield by reducing environmental damage to raw materials. Efficient layout of odd shaped pieces on sheet stock and combining the cutting of multiple long and short lengths on dimension lumber can increase yields. Paying careful attention during grading, drying, cutting, milling, sanding, assembling and finishing will reduce rework and rejected parts. Keep cutting and milling machinery in good operating order. Keep the cutting edges of tools sharp. Keep machine guides clean and square.

Reuse

Pieces of short stock can be finger jointed together to make usable lengths of "ribbon wood". Ribbon wood can be used where unmatched grain patterns are acceptable. Wood with imperfections like stains or knots can be used in rustic products. The goal is to reduce disposal needs and convert low or no value wood into higher value products.

Recycle

A dust collection system will reduce wear on equipment, improve your working environment, improve sanding efficiency, and keep collected sawdust from becoming contaminated with dirt and other contaminants that may reduce your ability to recycle this waste. Clean sawdust can be used as raw materials in the manufacturing of particle board, chip core, laminates, and specialty press molded products like sheet stock and shipping pallets. However, to sell into those markets will require a larger supply than most shops have. Shredded materials and sawdust can be used for animal bedding, composting operations, paper manufacturing, and landscaping mulch. For more information, see the *Dust Collection* guide sheet in this publication.

Solid scrap is unavoidable, but careful layout and good work practices will reduce the quantity. Unfinished scrap, not otherwise reused in your shop, may be recycled by grinding it into mulch. This may also be bundled and sold for kindling. There are also companies in parts of the state who will take your scrap for recycling. Contact the Environmental Assistance Office (EAO) at 1-800-361-4827 for help in finding ways to recycle your scrap and avoid landfill cost.

Energy Recovery

Unfinished wood wastes can be used as fuel in an industrial boiler or wood heater. The heat produced could be used in a dry kiln or to provide heat for the facility. Shredded wood and sawdust can be used as raw material in the manufacture of fuel pellets that are used in stoves

to provide heat for homes and commercial facilities. Before using wood as fuel, be sure to contact the EAO at 1-800-361-4827 and your local authorities to check on applicable environmental regulations. Note that burning of wood waste, except in a stove, furnace or boiler, is not allowed by air regulations.

Benefits

Reducing the amount of wood waste sent for disposal would decrease raw material costs, save disposal costs, increase your bottom line, foster good environmental stewardship and improve public relations.

Outside storage of wood waste and other industrial materials is regulated by the Department of Natural Resources Water Pollution Control Program. See the *Storm Water Permits* guide sheet in this publication for further information. Reducing, reusing, and recycling can reduce regulatory requirements and help prolong the life of our sanitary landfills.

Remember

- Contact the EAO and your local air program before using wood waste as fuel.
- Outside storage of materials requires a storm water permit from the Water Pollution Control Program.

Pollution Prevention Options

Preventing pollution instead of treating or disposing of it can save money, protect the environment and reduce risk to people. Here are some suggestions:

- ✓ Reduce waste and increase yield with careful layout procedures.
- ✓ Reduce waste by keeping raw materials protected from the elements.
- ✓ Keep tools sharp and in good operating order to reduce reject parts.
- ✓ Look for ways to convert low and no value wood into higher value products.
- ✓ Keep wood wastes clean and segregated by type to enhance recycling opportunities.
- ✓ Wood waste that cannot be reused or recycled should be considered for use as fuel.

For More Information

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Solvents

Waste solvents used in cleaning make up a part of the hazardous wastes from the manufacture of wood furniture. You can help protect the environment, protect workers in your shop and save money by reducing the amount of solvent you use, by reusing or recycling your solvent, and by using the least hazardous solvent that will do the job.

Air Pollution From Solvents

Many solvents contain volatile organic compounds (VOCs). Some solvents contain hazardous air pollutants (HAPs). These chemicals get into the air and can harm people and the environment. The Material Safety Data Sheet (MSDS) will have information on the amount of VOCs and HAPs in the products you buy. Always try to use the material with the lowest percentage of VOCs and HAPs possible. Missouri has rules to protect air quality. The types of rules that apply to your shop depend on the type and quantity of materials you use, as well as the size of your operation. See the *Air Quality Permits* and *MACT Standard* guide sheets for more information.

Waste Solvent

Many waste solvents are hazardous wastes. Some used solvents and still bottoms are on a list of hazardous wastes called the F list. Some unused solvents are on the U list. Common hazardous waste solvents include 1,1,1 – trichloroethane, trichloroethylene, xylene, acetone, methyl ethyl ketone, and toluene.

Some used solvents are hazardous because they are ignitable, toxic, reactive or corrosive. If the waste solvent has a flash point of less than 140° F, it is an ignitable hazardous waste. The flash point is the temperature at which the solvent will catch fire. Mineral spirits is a solvent with a flash point less than 140°F. If the pH is 12.5 or higher or if it is 2 or lower, the solvent is hazardous waste because it is corrosive.

Waste solvent should be reused, recycled on-site, recycled off-site or, as a last resort, disposed of as a hazardous waste. See the hazardous waste guide sheets and the additional solvent guide sheets for more information.

Reducing Solvent Waste

Purchase and disposal of solvent can be significant expenses for your business. It makes good sense to try to reduce the amount of solvent you use. Often, solvent can be reused, which means you can purchase less new solvent. When you reduce the amount of solvent you use, you save money and you protect the environment.

Here are some ideas for reducing solvent use at your shop:

- Keep solvent containers closed. Any solvent that evaporates at your shop is solvent you paid for and can't use. Some people estimate that as much as 40% of solvents are lost due to evaporation, equipment leaks, spills, or inappropriate use.
- Set up and follow a maintenance schedule for equipment. This can prevent leaks.

- Check regularly for leaks, drips and spills. Repair leaks and clean up spills right away.
- Use paint gun cleaners or reuse the solvent from cleaning the gun.
- Schedule jobs in a way that reduces the need to clean between jobs.
- Put a filter on your parts washer.
- Keep solvent containers closed. This is so important that the list begins and ends with it.

Remember

- Your solvent may be hazardous waste.
- Use the least hazardous solvent that will do the job.
- Ask your supplier if non-hazardous solvents are available.
- Solvent that evaporates is solvent you paid for and can't use. Keep containers tightly closed and in good condition.
- Use the solvent with the lowest VOC and HAP content possible.

For More Information

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Solvent Disposal

Solvent is both expensive to buy and to discard. It makes sense to try to reduce the amount of solvent you use and, if possible, reuse your solvent. See the *Solvents and Solvent Recycling* guide sheets for more information about recycling and reuse.

Many waste solvents are hazardous wastes. It is very important that you manage your hazardous wastes according to the regulations. The *Hazardous Waste* and *Hazardous Waste Management* guide sheets have more information.

To manage your waste solvent properly you need to:

- Find out whether your waste is hazardous.
- Figure out how much hazardous waste you generate.
- Learn what rules apply to you based on how much waste you generate.
- Use the services of a waste transporter and disposal or recycling company who is legally able to take your waste.

Is Your Waste Hazardous?

The EPA maintains a list of wastes regulated as hazardous. Some common waste solvents on this list include: 1,1,1-trichloroethane, trichloroethylene, xylene, acetone, methyl ethyl ketone (MEK), and toluene.

Some solvents are characteristic hazardous wastes, which means they are ignitable, toxic, reactive or corrosive. If the waste has a flash point of less than 140° F, it is an ignitable hazardous waste. The flash point is the temperature at which the solvent will catch on fire. Mineral spirits is a solvent with a flash point less than 140°F. Corrosive hazardous waste has a pH of 2 or less or a pH of 12.5 or higher.

Your solvent supplier should be able to tell you if your solvent is a hazardous waste, or you can check with the manufacturer. If you cannot find out from these sources, contact the Missouri Department of Natural Resources or another environmental professional for help. You will need the Material Safety Data Sheet (MSDS).

Even if the solvent itself is not a hazardous waste, contaminants in it may cause the used solvent to be a hazardous waste. If any contaminant in your used solvent is hazardous, your used solvent may be hazardous waste. Contact the department for more information on this. If your waste solvent is a listed hazardous waste, anything it is mixed with becomes hazardous waste. For example, if you use listed solvent on your shop towels, the towels become hazardous waste when discarded.

Managing the Waste

You need to keep track of how much hazardous waste you generate. The rules you must follow depend on how much waste you generate. To learn more about this, see the *Hazardous Waste* guide sheet.

Always keep good records about your waste, how much and what you generate, who transports it and where it goes. In most cases, you will need to get a generator identification number from the Department of Natural Resources and use a manifest when you ship the waste off-site. Your hazardous waste transporter must have a Missouri hazardous waste transporter license.

Be sure your waste is going to a place that is legally allowed to take it. For a list of hazardous waste facilities in Missouri, contact the department at 1-800-361-4827.

For more information on managing your hazardous waste solvent, see the *Hazardous Waste Management* guide sheet.

If your waste solvent is not a hazardous waste, check the MSDS for recommended disposal methods. Do not put liquids in your trash. Landfills in Missouri cannot accept liquid waste.

If the drains at your shop lead to a public sewer and wastewater treatment plant, you may be able to pour water-based solvents down the drain. Contact the wastewater plant to ask if they can accept the water-based solvent. **Do not** put solvent or other chemicals down the drain unless the wastewater plant has approved. **Do not** put solvent or any industrial waste down your drain if the drain does not lead to a public wastewater treatment plant. See the *Wastewater* guide sheet for more information.

Never pour solvent or any other waste onto the ground. Doing so can seriously harm the environment and you. Also, there are serious penalties for illegally disposing of waste.

Remember

- Find out whether your waste solvent is a hazardous waste. Ask your supplier for non-hazardous solvents.
- Be sure anyone who takes your waste is legally able to do so.
- Never pour any waste chemicals down the drain unless you have permission from the wastewater plant, and never pour any waste onto the ground.

For More Information

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Solvent Recycling

Whether you recycle your solvent on-site or have someone pick it up for recycling elsewhere, recycling your used solvent helps protect the environment and can save money. You need to find out if your used solvent is regulated as hazardous waste. You can find information on how to do that in the *Hazardous Waste* and *Solvents* guide sheets.

This guide sheet deals with recycling hazardous waste solvent. If your used solvent is not hazardous waste, check with your solvent vendor for information on managing/recycling used solvent. You can also call the Missouri Department of Natural Resources for help.

If you have a sink-type parts washer, filtering that solvent is not considered recycling. Filters on parts washers extend the life of the solvent. While this process is not considered recycling, it can help protect the environment and can save money.

On-site Recycling

Most on-site recycling of solvent is done with a distillation unit called a still. Used solvent is put in the still and heated to the boiling point. The solvent vapor is then cooled, producing nearly pure solvent.

To figure the cost savings from on-site recycling, consider the cost of new solvent and the cost of off-site recycling. In general, shops that generate 50 gallons of waste solvent per month will get their money back on a small still in about a year.

You need to contact the department before you begin recycling your solvent on-site. For small amounts, notify the Hazardous Waste Program, P.O. Box 176, Jefferson City, MO 65102. Send a letter that includes your name, the name and location of your facility, the wastes being recovered and the approximate quantity of waste recovered each year.

If you recycle more than 1,000 kilograms (2,200 pounds or about 26 gallons) on-site in a month, you must send an application to the department for a resource recovery certification. Contact the Environmental Assistance Office or the Hazardous Waste Program to get an application form. There will be a \$100 application fee.

After the solvent is distilled, there will be some settled residue called still bottoms. This material is usually a hazardous waste. If used solvent is filtered before distilling the used filters may also be hazardous waste. (This is also true for parts washer filters.) When in the accumulation area, store the waste still bottoms or filters in a closed container labeled with the date you first put the waste in the container and the words "Hazardous Waste." When the container is moved to the hazardous waste storage area, additional requirements need to be met. The date needs to be changed to the date the container goes to storage and the proper DOT labels and markings need to be added.

All hazardous wastes from your solvent recycling must be properly handled and disposed. See the *Hazardous Waste Management* guide sheet for more information.

Some recyclers have mobile recycling services. They bring equipment to your shop and recycle your solvents there. These businesses must have resource recovery certification in Missouri. If you use this type of service, ask the recycler to give you a copy of the approval letter from the department.

Off-site Recycling

You may choose to recycle waste solvents off-site with a commercial recycler. Some businesses will transport and recycle your solvent. Other recyclers offer a solvent tank maintenance service. They will come to your shop, remove the solvent and sludge from your tank and replace it with clean solvent. Solvent recycling facilities in Missouri must have resource recovery certification from the department.

If you send your waste solvent off-site, whether for recycling or disposal, you need to follow all hazardous waste requirements. The company that transports your waste solvent must have a Missouri hazardous waste transporter license. Other requirements depend on how much waste you generate. In most cases, you will need to get a generator identification number from the department and use a manifest when you ship the waste off-site. Be sure you get a copy of the completed manifest.

In some cases, you can have a contract with your solvent recycler instead of using a hazardous waste manifest. Small quantity generators of hazardous waste can do this. See the *Hazardous Waste* guide sheet to learn if you are a small quantity generator. The agreement with your recycler must include the type of waste and frequency of shipments. The waste must be transported to the recycling facility and the recycled material brought back to you in the recycler's own vehicle.

Remember

- If you recycle your hazardous waste solvent, you need to notify the department. You may need a resource recovery certification.
- If someone else recycles your hazardous waste solvent, that person needs a resource recovery certification from the department.
- Still bottoms and filters from recycling solvent usually are hazardous waste. Store them in closed, labeled containers before disposing of them with a facility permitted to accept hazardous waste.

For More Information

Missouri Department of Natural Resources
Environmental Assistance Office
P.O. Box 176
Jefferson City, MO 65102-0176
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Spills

Spills can hurt you and your employees. They can also cause environmental damage at your facility. Facilities of all sizes should maintain all containers and tanks in a way that prevents accidental releases. Spilled materials can pollute soils, ground water, surface waters and wetlands, affect air quality and harm people and wildlife. They can also cause problems at the wastewater treatment plants.

Effluents discharged through normal operations are *not* considered spills. Permission from the wastewater treatment plant is required before they are discharged in the sewer. These include:

- Water-based parts washer.
- Rinse water from containers.

A spill is an unplanned discharge of liquid waste of a significant volume into the sewer or the environment. Examples of spills include:

- A dropped container of a liquid material.
- Leaks.
- Overfilling a container.

Spills that typically are of the greatest concern include spills of strong solvents and some coatings. Some solvents and coatings are very toxic or very ignitable. Care should be taken that they are not allowed in the sewer. (Note: some solvents can melt your sewer pipes.) Read the Material Safety Data Sheet (MSDS) for your materials so that you will know what to do in an emergency.

You need to decide what you will do if there is a spill. We suggest you do the following:

- Develop and maintain a floor plan to identify all areas where a spill or discharge could occur.
- Determine the supplies and equipment required to clean up a spill and where you will store them. Always have the supplies on hand.
- Develop procedures for using the supplies and equipment.
- Train your employees in how to respond to a spill. Post the spill response instructions.
- Maintain a log of spills to identify trends and help eliminate the causes.
- Find out the "reportable quantity" for spills of your materials. The MSDS is an excellent resource for this information. Contact the Environmental Assistance Office for help in determining the "reportable quantity". (Note: If a "reportable quantity" of a chemical is spilled into the environment, the US Environmental Protection Agency and the Missouri Department of Natural Resources need to be notified of the spill.) The notification phone numbers are: Missouri Department of Natural Resources: 573-634-2436 and EPA National Response Center: 1-800-424-8802.

Remember

- Read Material Safety Data Sheets (MSDS).
- Prepare for spills.
- Cleanup spills.
- Report spills as needed.
- Find the cause of spills and correct the problem.

Pollution Prevention Options

Preventing pollution instead of treating or disposing of it can save money, protect the environment and reduce risk to people. Here are some suggestions:

- ✓ Use good work practices to prevent spills.
- ✓ Determine the best way to handle a spill, minimizing the amount of waste generated.
- ✓ Identify where floor drains discharge.
- ✓ Plug floor drains connected to the storm or sanitary sewer if they are located in an area subject to spills of hazardous materials. If necessary install a sump that is pumped regularly.

For More Information

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Storm Water Permits

Storm water runoff is part of the natural water cycle. However, outdoor storage of materials at your facility can add pollutants to rainwater and snowmelt. This polluted runoff, if not properly managed, can harm the environment, pollute creeks and lakes, and even contaminate drinking water.

The Federal Clean Water Act requires wood furniture facilities to obtain a storm water discharge permit if they store products or material outside, exposed to storm water. In Missouri, the Department of Natural Resources issues Missouri State Operating Permits for storm water discharges.

You **must** apply for and obtain a Missouri state operating permit for storm water discharge if you own or operate a wood furniture manufacturing operation unless:

- You **do not** store materials outside exposed to storm water **or**
- The storm water from your site discharges to a combined sewer system (storm sewers and sanitary sewers drain in a common pipe to a wastewater treatment plant). Your local public works office can tell you if your area has combined sewers.

Permits

General permits cover an entire industry, and are issued statewide for a period of five years. It is up to the individual facility operator to apply for the permit and pay the annual permit fee. The general permit will require you to develop a storm water pollution prevention plan (SWPPP) for the site.

Site-specific permits may be written for businesses that store toxic materials, have large amounts of potential contaminants exposed to rainfall, or is one of only a few of its kind in the state. The department may require an owner to apply for a site-specific permit if it is needed to better protect water quality. This permit also has an annual fee.

Construction Projects

If your construction project will include the removal of vegetation, grading or excavating in an area one acre or larger, you will need a land disturbance permit. Land disturbance permits require the use of best management practices (BMPs) to minimize soil erosion from the site. BMPs include maintaining vegetation, temporary re-vegetation, silt fences, straw bales and sediment basins.

Remember

➤ If you own or operate a wood furniture manufacturing business in Missouri, you must have a Missouri state operating permit for your storm water discharge unless:

- Your business is located in an area with combined sanitary and storm sewers, or
- You do not store materials outside.

Pollution Prevention Options

Preventing pollution instead of treating or disposing of it can save money, protect the environment and reduce risk to people. Here are some suggestions:

- ✓ Store materials indoors if possible.
- ✓ Provide cover for materials stored outdoors.
- ✓ Use interceptor dikes, swales or berms to direct storm water away from storage areas and areas that are prone to erosion.
- ✓ Re-vegetate disturbed or bare soil areas as soon as possible.
- ✓ Prevent spills.
- ✓ Maintain appropriate spill containment equipment and train employees how to use it.
- ✓ Visually inspect storm water in secondary containment structures prior to discharging water to grassy areas. Use absorbents to remove any petroleum sheen on water prior to discharge.

For More Information

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VOCs and HAPs

Many coatings and solvents used in the manufacture of wood furniture contain chemicals referred to as volatile organic compounds (VOCs) or hazardous air pollutants (HAPs).

VOCs are chemicals that evaporate into the air, then react with sunlight to form urban ozone (smog). Smog has serious health effects on the human respiratory system. Aside from coughing, headaches and nausea, smog can cause permanent lung damage.

HAPs are chemicals that are believed to cause cancer. Exposure to HAPs can also cause health effects such as birth defects, nerve disorders and other chronic and acute diseases. Many VOCs are also HAPs.

To protect public health and the environment, federal and state regulations limit the amount of VOCs or HAPs that can be released into the air by businesses. If you use chemicals that contain VOCs or HAPs, you may be subject to these regulations. See the *Air Quality Permits* and *MACT Standard* guide sheets for more information.

VOCs and HAPs are the primary air pollutants for which wood furniture manufacturers are regulated. Regulated air emissions come primarily from paints, stains, sealers, topcoats, cleanup solvents and adhesives. See the list of common VOCs and HAPs at the end of this guide sheet.

Check the Material Safety Data Sheet (MSDS) for each product your facility uses. This should list the VOCs or HAPs contained in the product. Your supplier should be able to help you find this information.

VOCs and HAPs pose a risk to employee health, public health and the environment. Many of these chemicals are also regulated as hazardous waste. They may also increase the risk of fire or explosion. Most wood furniture manufacturers find it is worthwhile to find ways to reduce the amount of the chemicals they use. Here are some suggestions for how you can reduce VOC and HAP use in your shop:

- Work with your vendors to find products that contain little or no air pollutants. Look for low-VOC and HAP-free paints, stains, sealers, topcoats, cleanup solvents and adhesives. Don't forget about maintenance chemicals, paints and cleaning chemicals.
- Reuse the solvent from cleaning paint guns.
- Use a paint gun cleaner.
- Reclaim solvents using an on-site distillation unit. See the *Solvent Recycling* guide sheet for more information.
- Store VOC-containing materials in closed containers. Open containers allow VOCs to evaporate, causing air pollution and wasting money.
- Use closed containers for solvent at workstations.

- Add receiving funnels with automatically closing covers to storage containers to reduce spills and evaporation.
- Collect and store used rags in a self-sealing, flame-resistant can. If the rags are regulated hazardous waste, be sure the containers are properly labeled. See the *Shop Towels* guide sheet for more information.
- Use the least amount of cleaner possible.
- Be sure your employees realize the risks and costs associated with VOCs and HAPs. Train them to use good housekeeping and pollution prevention practices such as those described here. Ask for their ideas on preventing pollution.

Remember

- VOCs are volatile organic compounds. HAPs are hazardous air pollutants. These chemicals cause air pollution and pose a threat to human health and the environment.
- VOCs and HAPs are regulated air pollutants. They may also be regulated hazardous waste. Learn what chemicals you have and follow the rules that apply to them.
- Insist that your supplier help you find chemicals with little or no VOCs or HAPs. Look especially for low-VOC, HAP-free paints, stains, sealers, topcoats, cleanup solvents and adhesives.

Some VOCs and HAPs Commonly Reported by Wood Furniture Manufacturers*

Toluene
 Ethylene glycol
 Xylene (mixed isomers and ortho-xylene)
 Glycol ethers
 Methylene chloride
 Methanol
 Methyl ethyl ketone (MEK)
 Methyl isobutyl ketone (hexone)
 Methyl chloroform
 Naphtha
 Ethylbenzene
 Formaldehyde
 Styrene
 Di(2-Ethylhexyl) Phthalate
 Trichloroethylene
 Chromium
 Cumene

*This is not a complete list of chemicals regulated as air pollutants. Contact the Missouri Department of Natural Resources' Environmental Assistance Office for more information.

For More Information

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Wastewater

Wood furniture manufacturers generate wastewater during daily operations, particularly if you use water-based coatings that clean up with soap and water. This wastewater may contain contaminants that can create "interference" with the wastewater treatment process at the wastewater treatment plant.

Communities that provide sewer collection and wastewater treatment service may have pretreatment requirements for your wastewater discharge. Pre-treatment is the reduction, elimination, or alteration of pollutants before discharge to a publicly owned wastewater system. You may be restricted in the amount of contaminants you can put down the drain. If your business is connected to public sewers, contact the utility to determine if there are discharge limits and prohibitions.

If public sewers and wastewater treatment are not available, you must carefully manage your shop's wastewater. You must manage hazardous wastewater by sending it to a permitted hazardous waste facility. See the *Hazardous Wastes* guide sheet for more information.

Wastewater from wood furniture manufacturing is "industrial wastewater" and **cannot** be discharged to an on-site wastewater system regulated by the Missouri Department of Health and Senior Services (e.g. septic tank and drain field). You may discharge your "domestic wastewater" (water from restrooms or kitchen facilities) to a septic system.

Industrial wastewater **can** be treated on-site in a wastewater treatment plant permitted by the Missouri Department of Natural Resources. Another option is to collect your industrial wastewater and send it off-site to a wastewater treatment facility permitted by the department.

Do not send industrial wastewater to a septic system, doing so could contaminate the groundwater.

Good waste management practices that reduce, reuse and recycle wastewater can greatly reduce your disposal costs. They will also help protect sewer systems and treatment plants. These waste management practices are called pollution prevention. If you use water base coatings or are considering their use, common sense practices such as cleaning equipment with the smallest possible volume of water can minimize your wastewater and reduce your disposal cost.

Remember

- Treat your industrial wastewater at a wastewater treatment plant that is permitted by the department.
- If your business is served by a public wastewater utility, contact the utility to determine your wastewater discharge limits and prohibitions. You may need to pretreat your wastewater before it goes to the treatment facility.

- Do not send industrial wastewater to a septic system.
- Do not dispose of wastewater into storm drains, onto the ground, or into a body of water.

Pollution Prevention Options

Preventing pollution can save money, protect the environment and reduce risk to people. Here are some suggestions:

- ✓ Implement best management practices including employee training, inventory control, spill response planning and good housekeeping.
- ✓ Never have floor drains where hazardous materials are stored.
- ✓ If a small spill occurs, clean it immediately using absorbents. Never clean spills by hosing them down with water.
- ✓ Use dry floor cleaning methods including sweeping and vacuuming.
- ✓ Minimize water use for equipment cleaning. Reuse the water until it is too dirty to clean effectively. Use only non-toxic soaps and cleaners.
- ✓ Train employees to use water efficiently.
- ✓ If water based coatings require dilution; mix only enough coating for the job. Follow the manufacturer's directions for mixing.
- ✓ If you collect your wastewater in a holding tank for off-site treatment, try to reuse it whenever possible.
- ✓ Consider purchasing a recycling unit for on-site wastewater treatment.
- ✓ If your wastewater is non-hazardous, consider purchasing evaporating equipment to evaporate your wastewater. It should be noted that an evaporator may have air emissions that could effect air permitting requirements. Solids left after evaporation may be a hazardous waste.

For More Information

Missouri Department of Natural Resources
Environmental Assistance Office
P.O. Box 176
Jefferson City, MO 65102-0176
1-800-361-4827 or (573) 526-6627
www.dnr.mo.gov/oac/env_assistance.htm



Water Conservation

Water conservation can reduce cost and help the environment. Parts of Missouri have recently experienced drought and water is not an unlimited resource. Water conservation can help to conserve energy if you heat any portion of the water.

Following are tips to reduce water consumption.

1. Maintain Water-Supply Equipment

Check pipes, valves, hoses and faucets for leaks. A small leak occurring over an extended period results in a large water loss. Often, comparatively little effort and expense are required to fix the problem, especially if it is caused by a leaky joint or a worn faucet washer.

2. Reduce Waste Water In Operations

If you have switched to water-based adhesives, coatings or both, follow manufacturer's directions on mixing and cleanup. For cleaning and mixing, run water only as needed. Water running in a sink is money and resources wasted down the drain. Train workers to minimize water use.

3. Know Your Water Use

Read your meter and check your water bills. Check the meter during off hours. A running meter may indicate a leak. Keep records to see if there are any unexplained changes that might indicate leaks, or a meter that needs replacement.

4. Recycle and Reuse Water Wherever Feasible.

5. When replacing plumbing fixtures, buy water saving models.

6. Lawn watering.

If you have grass, shrubs and flowers, water only as needed. Measure the application rate for your sprinkler with the "tuna can" method and invest in a rain gage. Water early in the day to minimize evaporation.

Remember

- Water is a finite resource, and small savings add up both in your bottom line and a better environment.
- Keep records of water use to identify unexplained changes that could be leaks.
- Read your meter to verify your bill.
- Make employees aware of the benefits of water conservation to them as well as to your business.

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UPDATE SERVICE FOR WOOD FURNITURE MANUFACTURING

Please complete this form and send it to the address below to receive FREE UPDATES to "Preventing Pollution in Wood Furniture Manufacturing." You will receive new and revised pages as they are developed. Please print clearly or type.

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**Mail to: Missouri Department of Natural Resources
Environmental Assistance Office
P.O. Box 176
Jefferson City MO 65102-0176** **or fax to: (573) 526-5808**

Questions about this guide or other services may be directed to EAO at 1-800-361-4827.

